Stoller
Hanford Office

DOE-EM/GJ716-2004

299-E33-49 (C4261)
Log Data Report

Borehole Information:

Borehole: 299-E33-49 (C4261)			**Site:** South of BX Tank Farm		
Coordinates (WA State Plane)		**GWL (ft)[1]:** 265.4		**GWL Date:**	07/26/2004
North	**East**	**Drill Date**	**TOC[2] Elevation**	**Total Depth (ft)**	**Type**
Unknown	Unknown	7/26/04	Unknown	288	Cable Tool

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded steel	4.5	11 3/4	10 3/4	1/2	+4.5	285
The logging engineer measured casing diameters and stick-up with a steel tape. All measurements were rounded to the nearest 1/16 in. The driller reports basalt at 283 ft and open hole below 285 ft.						

Borehole Notes:

This borehole is located approximately equidistant between boreholes 299-E33-339 (C3392) and 299-E33-335 (B8811).

Logging Equipment Information:

Logging System:	Gamma 4E		**Type:** 70% HPGe (34TP40587A)
Calibration Date:	05/2004	**Calibration Reference:**	DOE/EM-GJ692-2004
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0

Logging System:	Gamma 2F		**Type:** NMLS (H380932510)
Calibration Date:	09/2003	**Calibration Reference:**	GJO-2003-520-TAC
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2 Repeat	3		
Date	07/28/04	07/29/04	07/29/04		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth (ft)	287.0	127.0	96.0		
Finish Depth (ft)	97.0	97.0	0		
Count Time (sec)	100 s	100 s	100 s		
Live/Real	R	R	R		
Shield (Y/N)	N/A[3]	N/A	N/A		
MSA Interval (ft)	1.0	1.0	1.0		

Log Run	1	2 Repeat	3		
ft/min	N/A	N/A	N/A		
Pre-Verification	DE151CAB	DE161CAB	DE161CAB		
Start File	DE151000	DE161000	DE161031		
Finish File	DE151190	DE161030	DE161127		
Post-Verification	DE151CAA	DE161CAA	DE161CAA		
Depth Return Error (in.)	-1.5	N/A	0		
Comments	No fine-gain adjustment.	Repeat section.	No fine-gain adjustment.		

Neutron Moisture Logging System (NMLS) Log Run Information:

Log Run	1	2	3	4 Repeat	
Date	08/02/04	08/02/04	08/02/04	08/02/04	
Logging Engineer	Spatz	Spatz	Spatz	Spatz	
Start Depth (ft)	0	100.0	200.0	200.0	
Finish Depth (ft)	101.0	201.0	264.75	230.0	
Count Time (sec)	N/A	N/A	N/A	N/A	
Live/Real	R	R	R	R	
Shield (Y/N)	N/A	N/A	N/A	N/A	
MSA Interval (ft)	0.25	0.25	0.25	0.25	
ft/min	1.0	1.0	1.0	1.0	
Pre-Verification	BF178CAB	BF178CAB	BF178CAB	BF178CAB	
Start File	BF178000	BF178405	BF179000	BF179261	
Finish File	BF178404	BF178809	*BF179259	BF179381	
Post-Verification	BF179CAA	BF179CAA	BF179CAA	BF179CAA	
Depth Return Error (in.)	N/A	N/A	N/A	-2	
Comments	None	Data directory change.	Data directory change. *File -260 is not a complete interval or count time.	Repeat section.	

Logging Operation Notes:

Zero depth reference is the ground surface. Logging was performed with a centralizer on the sonde . Pre- and post-survey verification measurements for the SGLS employed the Amersham KUT (^{40}K, ^{238}U, and ^{232}Th) verifier with serial number 118. Maximum log depth was 287 ft, approximately 2 ft into the open borehole.

Analysis Notes:

Analyst:	McCain	Date:	09/03/04	Reference:	GJO-HGLP 1.6.3, Rev. 0

SGLS pre-run and post-run verification spectra were collected at the beginning and end of each day. Net count rates for the 1461-keV gamma lines were slightly below verification criteria on both days, and net count rates for the 2614-keV gamma line were slightly below the acceptance criteria on the second day. All results were within the HASQARD 20% limits. Peak width (fwhm) values were within the verification criteria. Examination of individual spectra indicated the system appears to be functioning normally and the spectra are provisionally accepted.

Log spectra for the SGLS were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Pre-run verification spectra were used to determine the energy and resolution calibration for processing the data using APTEC SUPERVISOR. Concentrations were calculated in EXCEL (source file: G4EJun04.xls), using parameters determined from analysis of recent calibration data. Zero reference was the ground surface. The casing configuration was assumed to consist of a 10 3/4-in. casing from the ground surface to 287 ft. A casing thickness of 0.5 in. was used. The maximum log depth was 287 ft.

The neutron moisture log was processed to obtain total counts. No attempt was made to calculate moisture content, because the borehole diameter is significantly larger than calibration conditions.

Log Plot Notes:

Separate log plots are provided for gross gamma and dead time, naturally occurring radionuclides (^{40}K, ^{238}U, and ^{232}Th), and man-made radionuclides. Plots of the repeat logs versus the original logs are included for natural radionuclides. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, or casing correction. These errors are discussed in the calibration report. A combination plot is also included to facilitate correlation. The neutron moisture gage response in counts per second (cps) is plotted on the combination plots.

Results and Interpretations:

No man-made radionuclides were detected in this borehole. ^{137}Cs was detected sporadically at or near the MDL (0.2 pCi/g). Evaluation of spectra indicates the reported values are due to statistical fluctuations and do not represent actual occurrence of ^{137}Cs.

The plots of the repeat logs demonstrate reasonable repeatability of the SGLS data for the natural radionuclides (609, 1461, 1764, and 2614 keV).

Neutron moisture logs are plotted as counts per second versus depth. Because the borehole diameter is significantly different from calibration conditions, the log is qualitative only.

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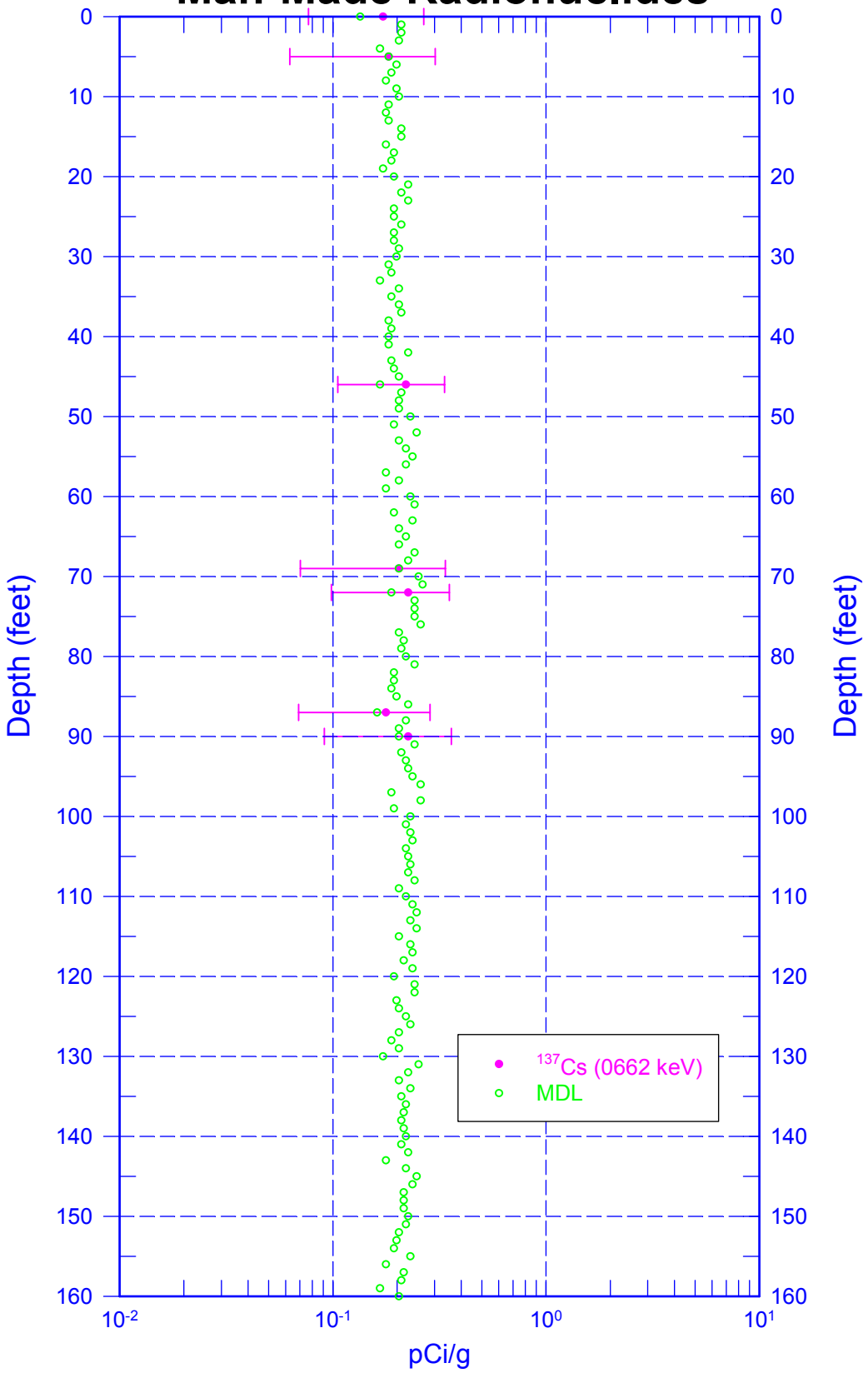
[1] GWL – groundwater level
[2] TOC – top of casing
[3] N/A – not applicable

299-E33-49 (C4261)

Man-Made Radionuclides



Zero Reference = ground surface

Date of Last Logging Run
7/29/2004

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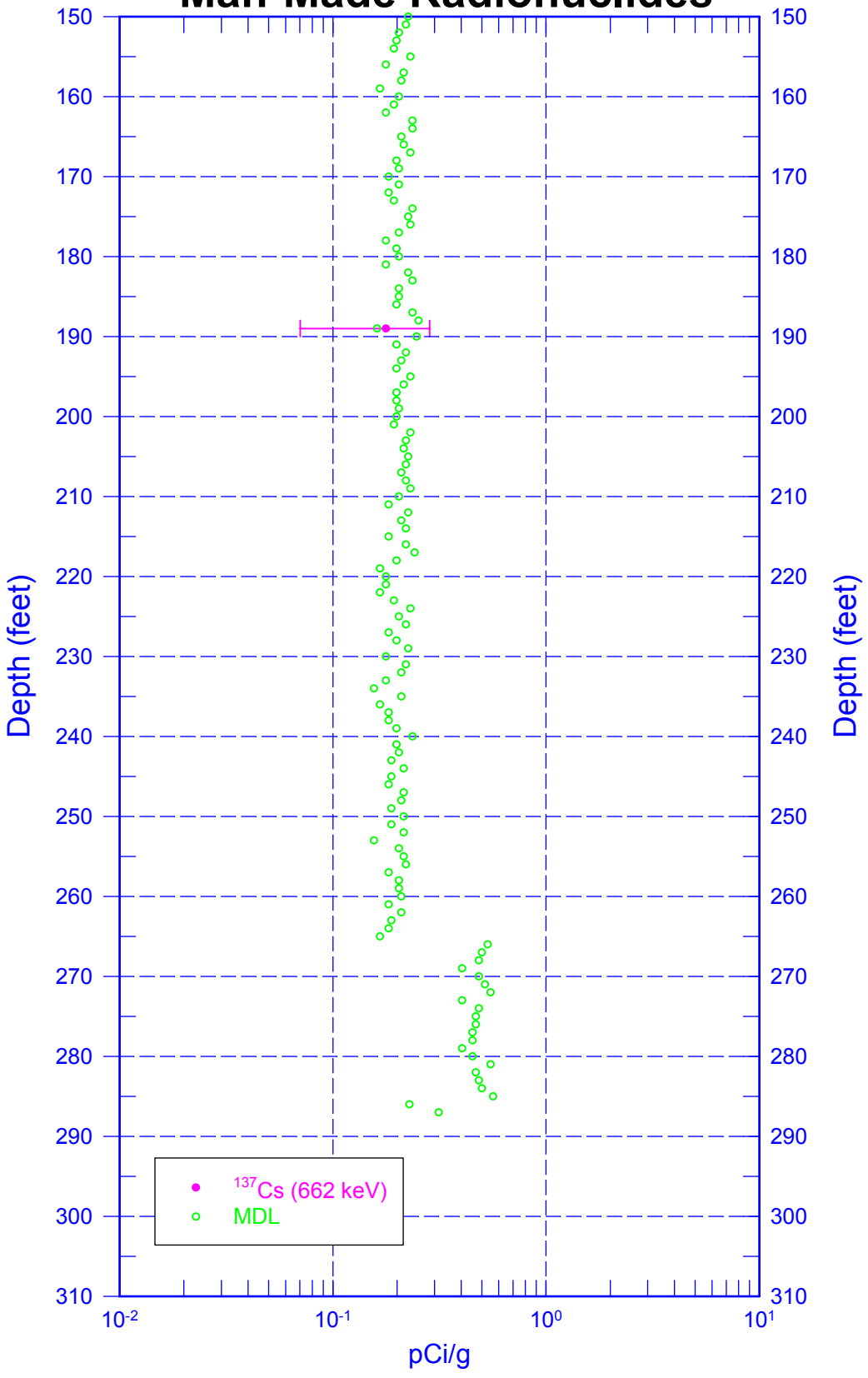
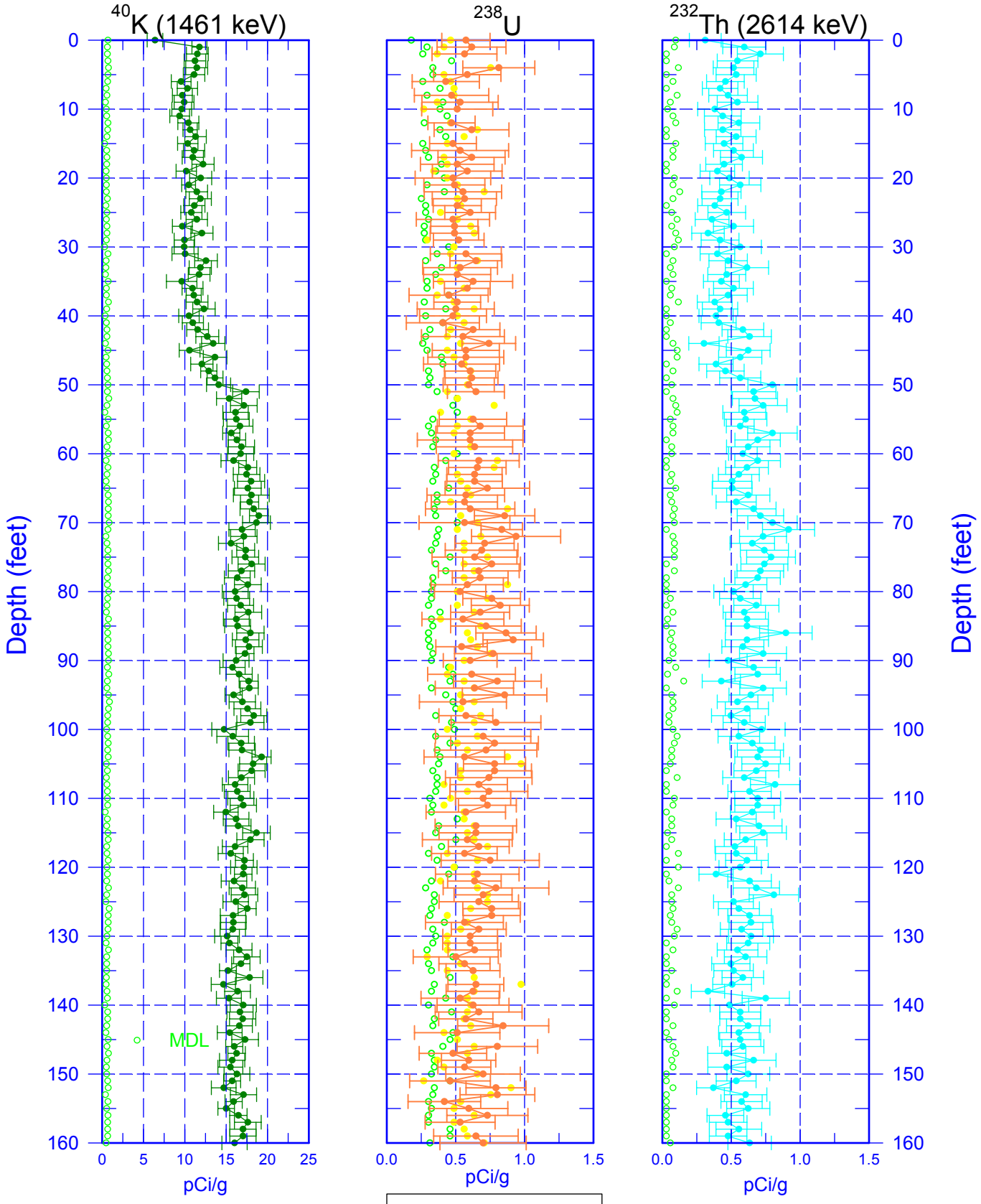
Man-Made Radionuclides



Zero Reference = Ground SUrface

Date of Last Logging Run
7/29/2004

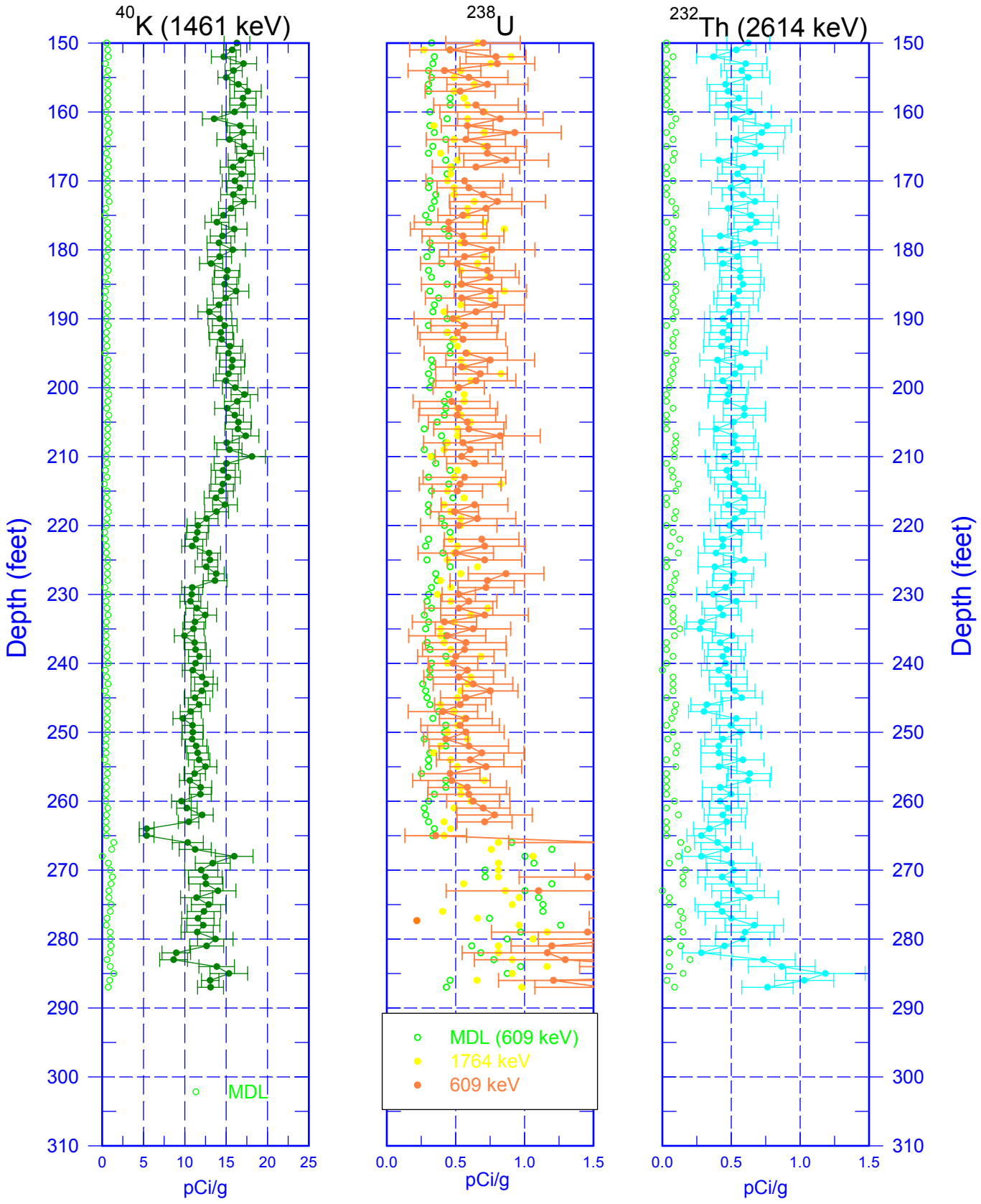
299-E33-49 (C4261)
Natural Gamma Logs



Zero Reference = Ground surface

Last Log Date - 07/29/04

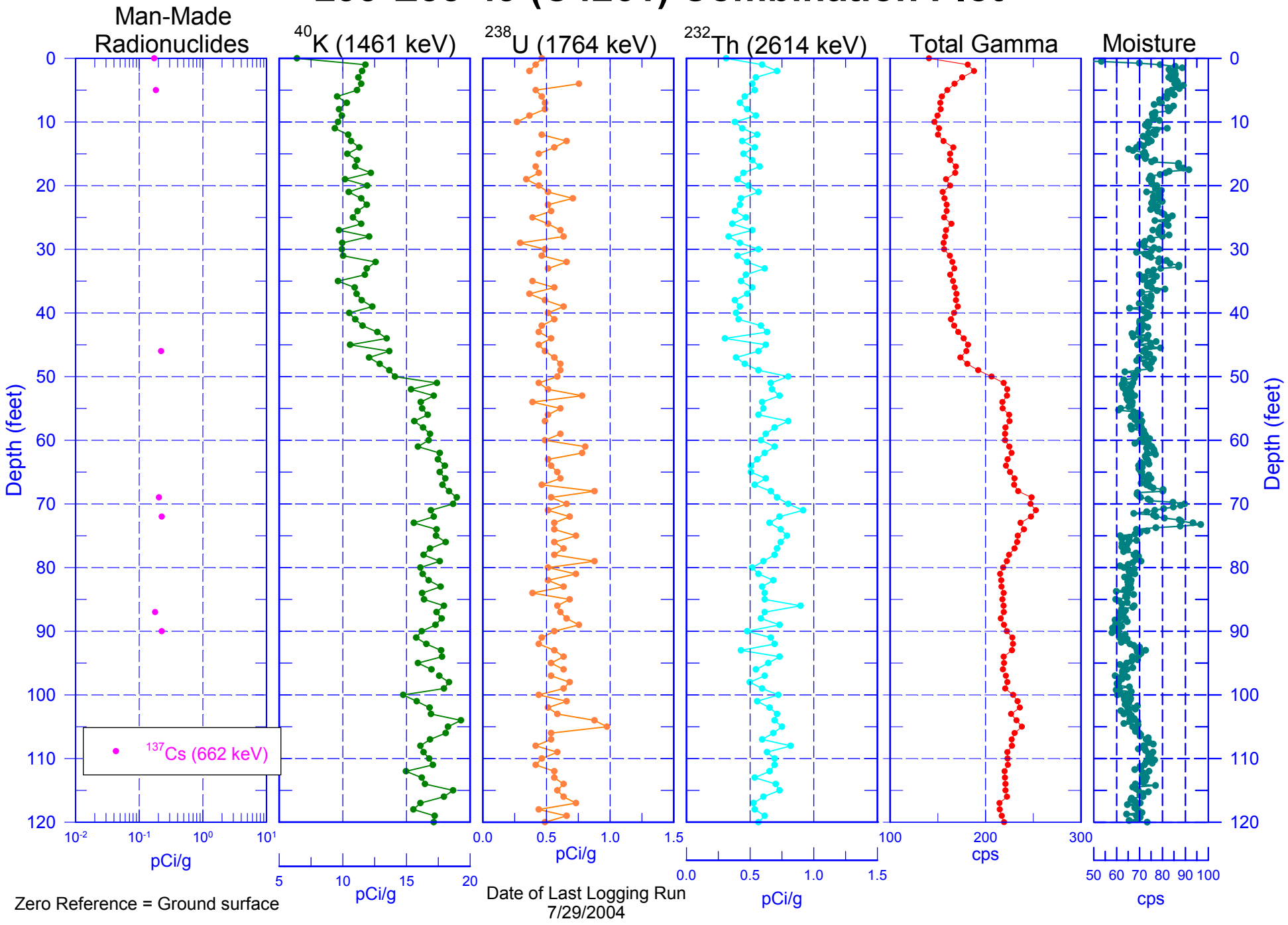
299-E33-49 (C4261)
Natural Gamma Logs



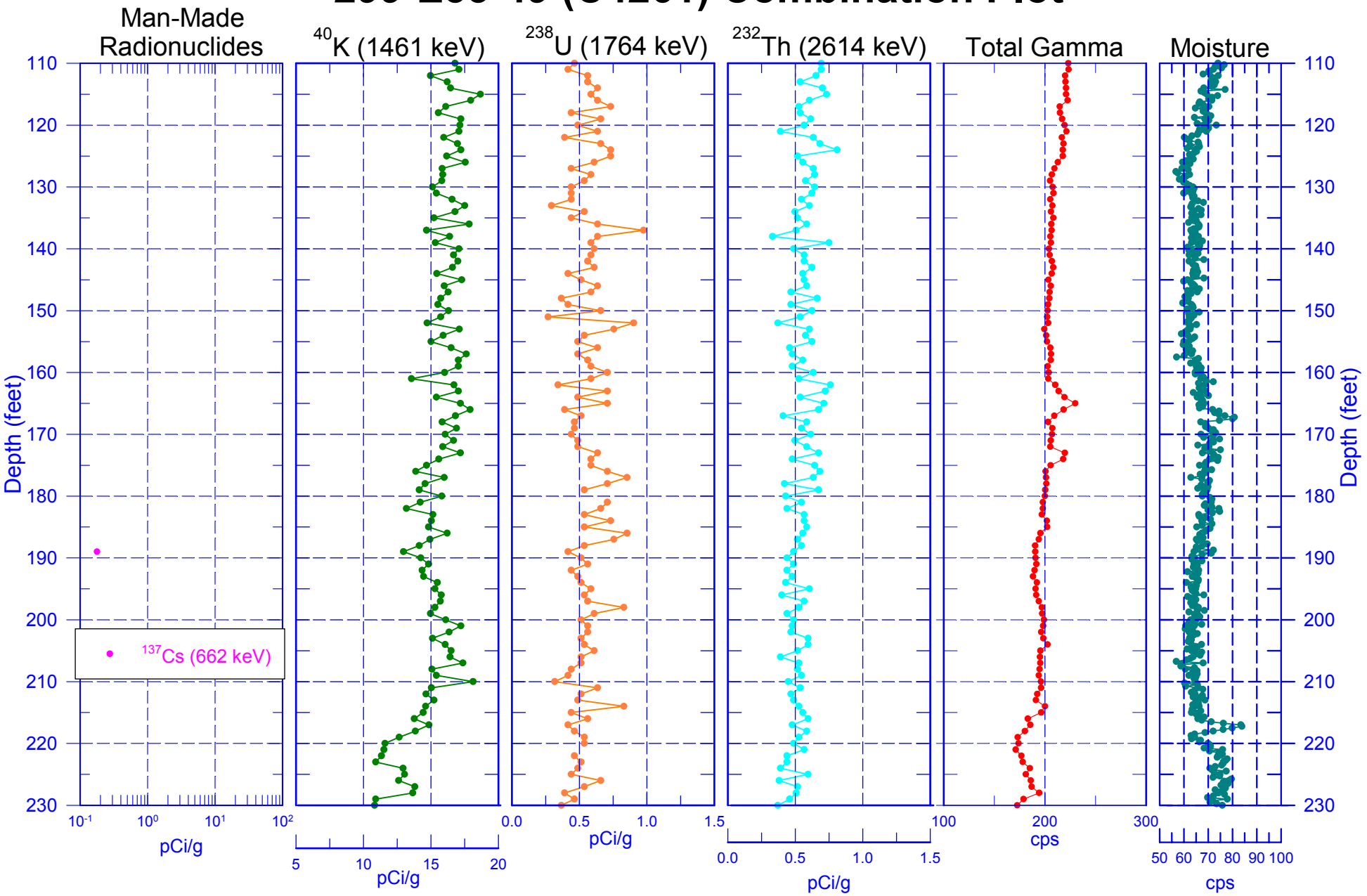
Zero Reference = ground surface

Last Log Date - 07/29/04

299-E33-49 (C4261) Combination Plot



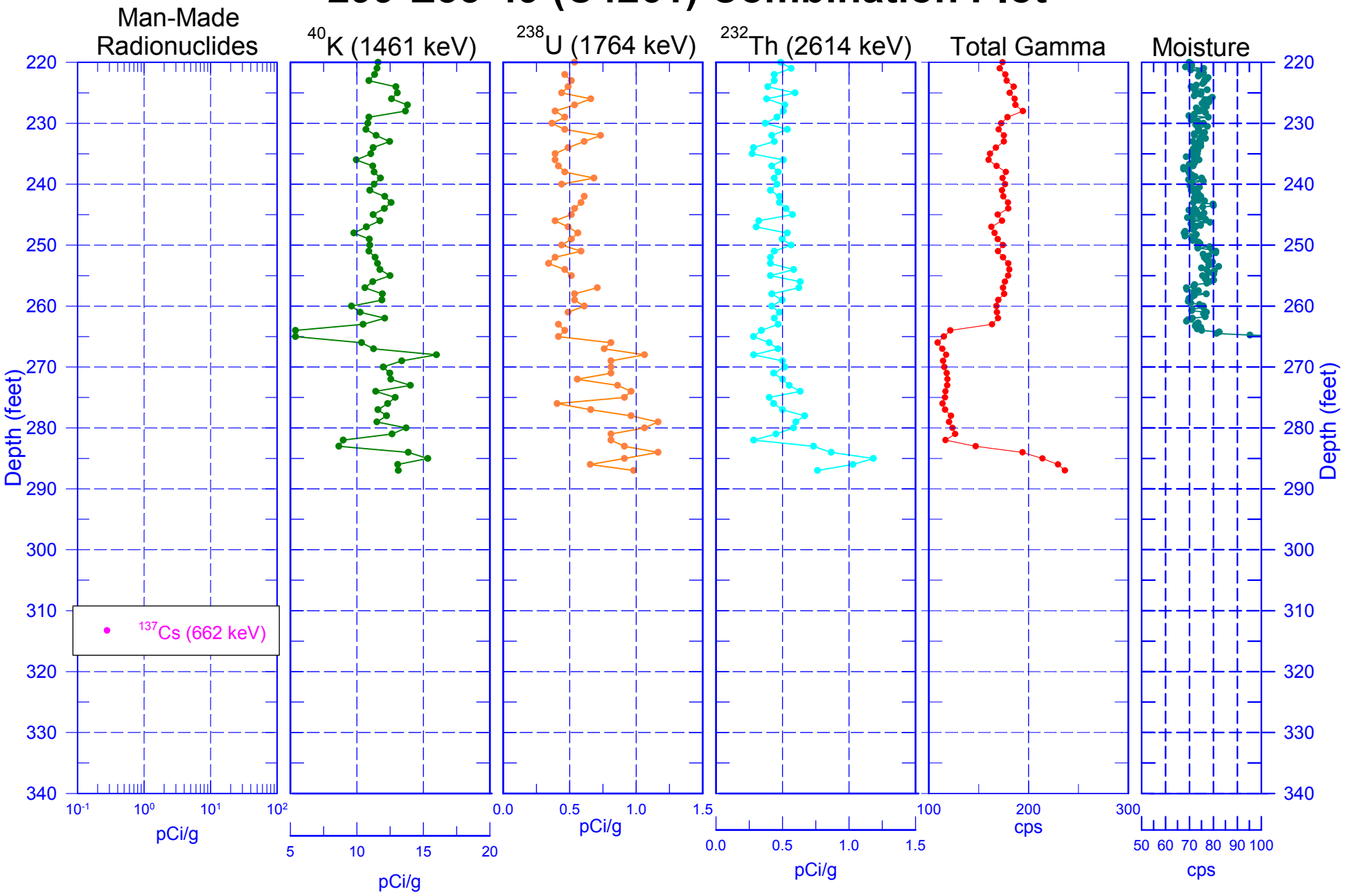
299-E33-49 (C4261) Combination Plot



Date of Last Logging Run
7/29/2004

Zero Reference = Ground surface

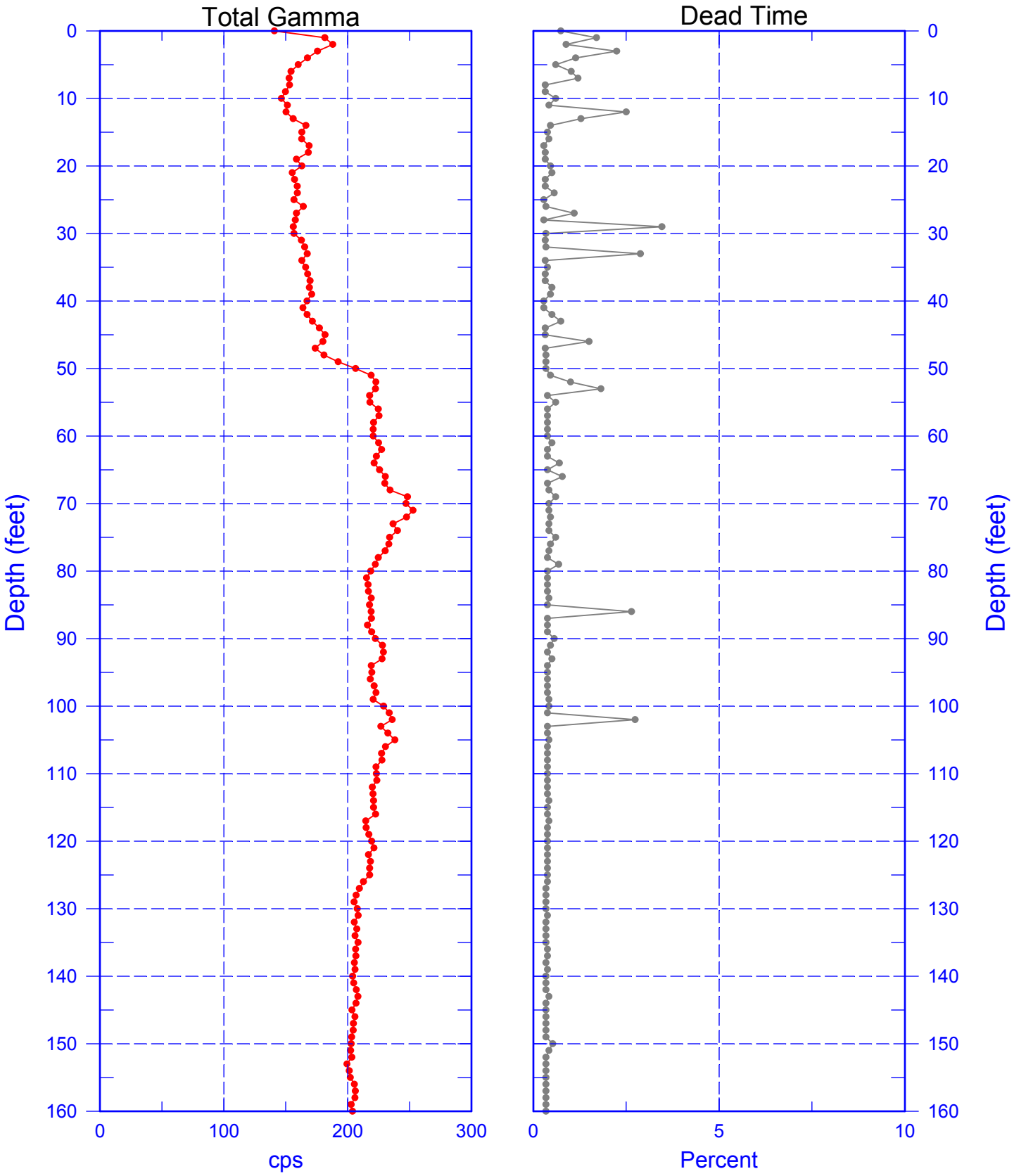
299-E33-49 (C4261) Combination Plot



Date of Last Logging Run
7/29/2004

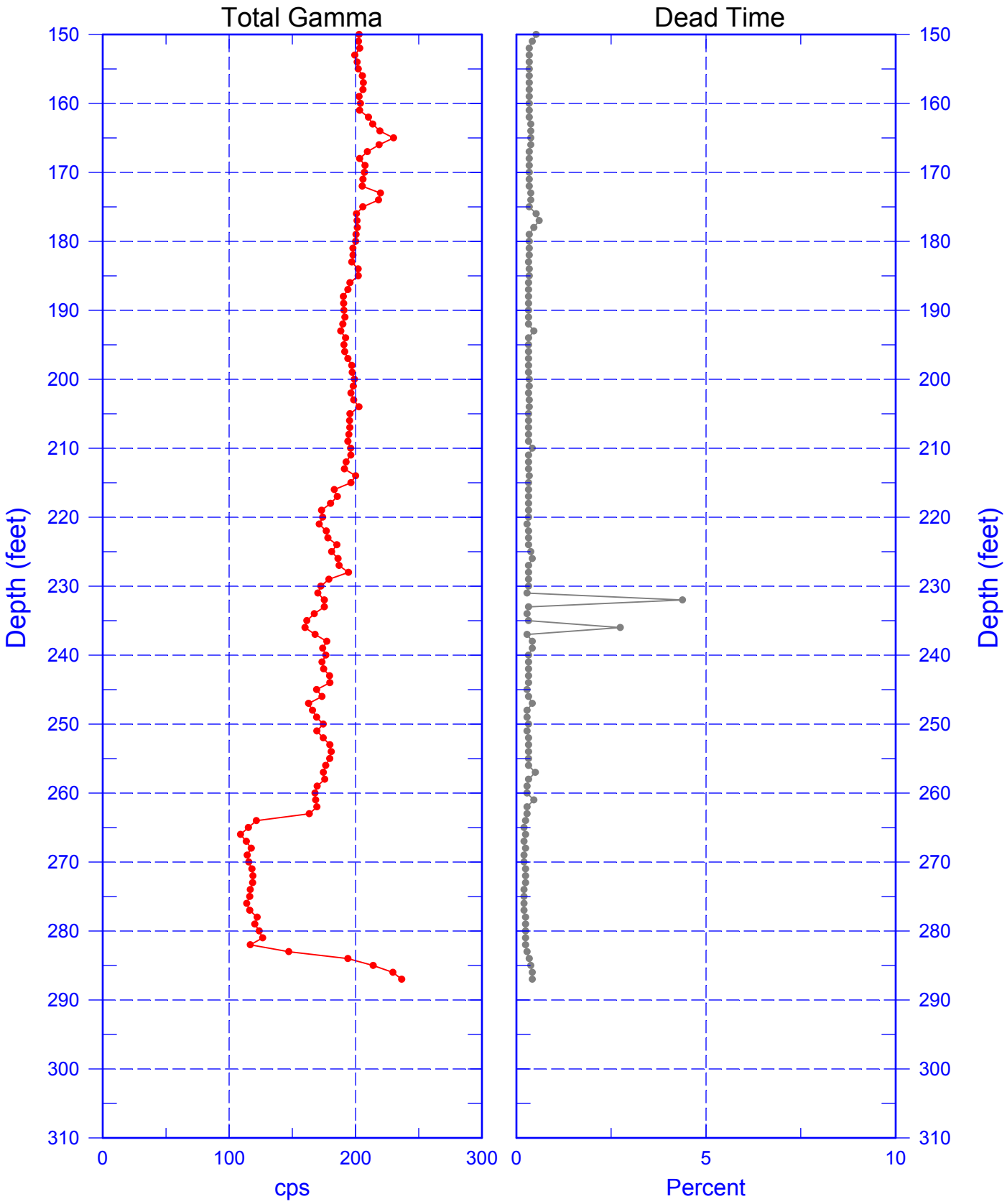
Zero Reference = Ground surface

299-E33-49 (C4261)
Total Gamma & Dead Time



Zero Reference = Ground Surface
Date of Last Logging Run
7/29/2004

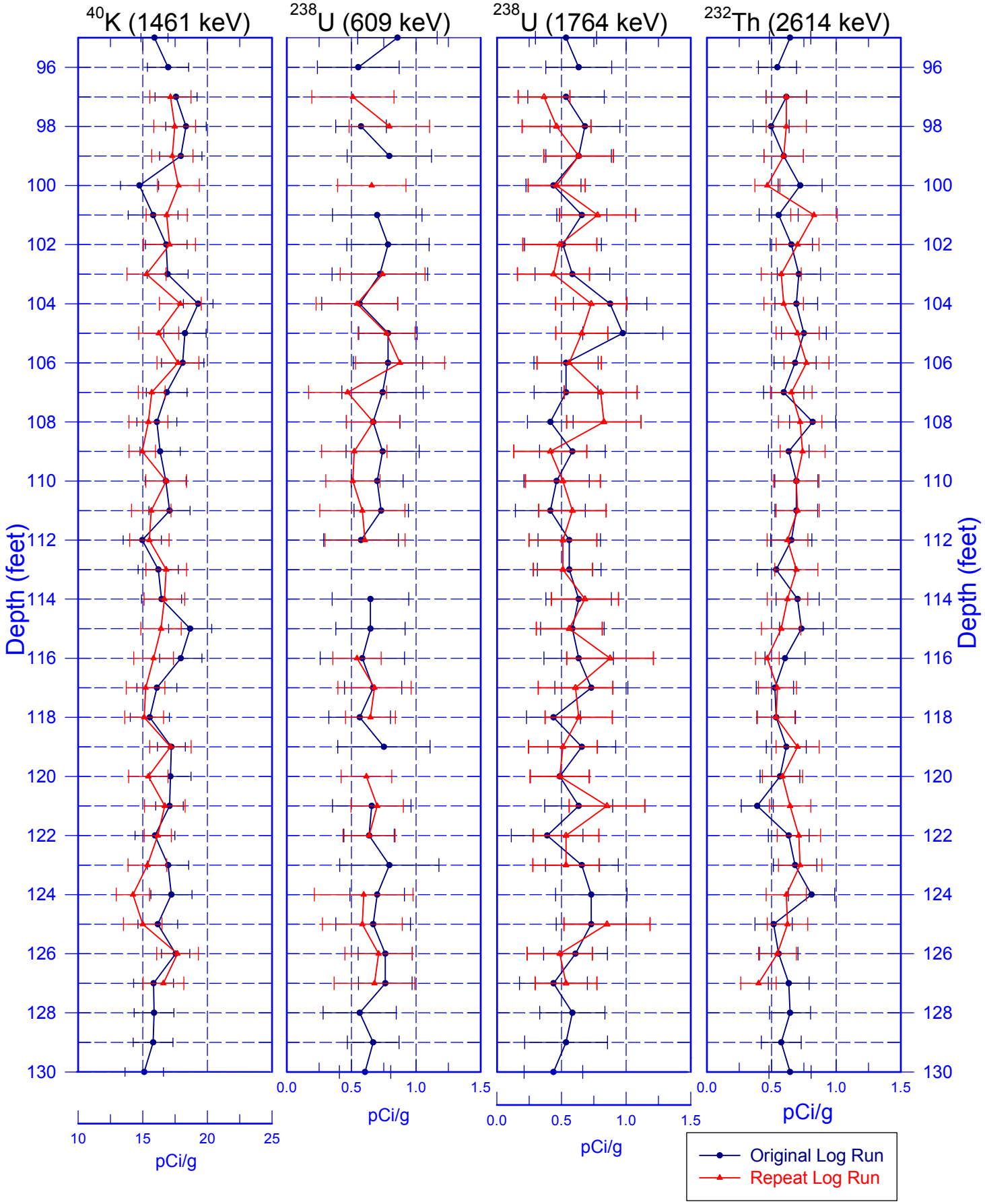
299-E33-49 (C4261)
Total Gamma & Dead Time



Zero Reference = Ground Surface
Date of Last Logging Run
7/29/2004

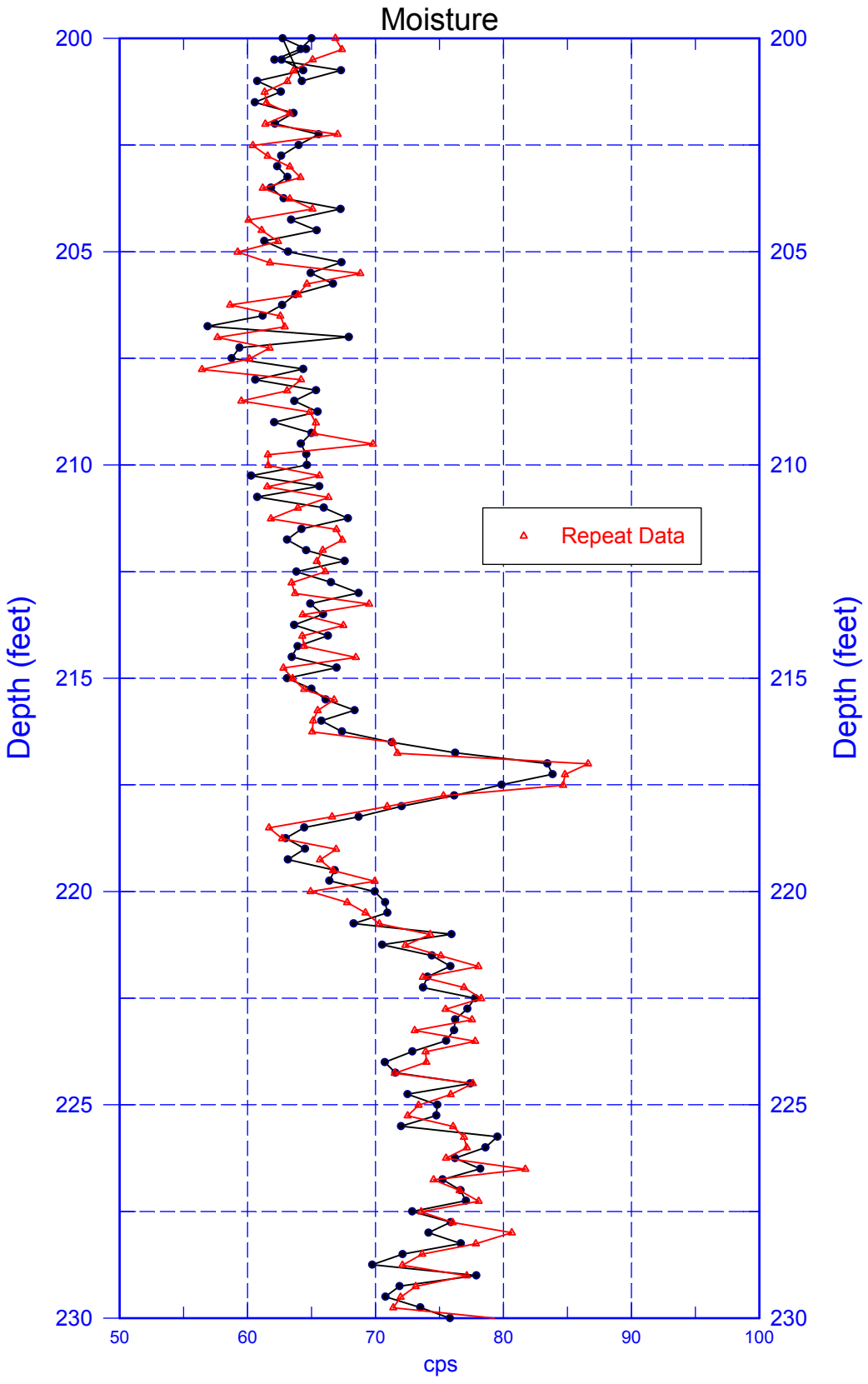
299-E33-49 (C4261)

Rerun of Natural Gamma Logs (97.0 to 127.0 ft)



299-E33-49 (C4261)

Moisture Repeat Section



299-E33-49 (C4261)

Rerun of ^{137}Cs